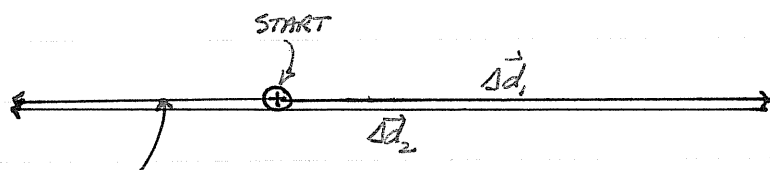


ADDING COLINEAR VECTORS

- #1 $\Delta \vec{d}_1 = 13 \text{ km [E]}$ ← THE CAMPER'S 1ST DISPLACEMENT
 $\Delta \vec{d}_2 = 20 \text{ km [W]}$ ← THE CAMPER'S 2ND DISPLACEMENT

VECTORIALLY 1 cm : 2 km \uparrow N



RESULTANT VECTOR

$$\Delta \vec{d} = 7 \text{ km [W]}$$

$$\begin{aligned} \text{(a)} \quad \vec{d}_f &= \Delta \vec{d}_1 + \Delta \vec{d}_2 \\ &= 13 \text{ km [E]} + 20 \text{ km [W]} \\ &= 13 \text{ km [E]} + (-20) \text{ km [E]} \\ &= -7 \text{ km [E]} \\ &= +7 \text{ km [W]} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad \Delta \vec{d} &= \vec{d}_f - \vec{d}_i \\ &= 7 \text{ km [W]} - 0 \\ &= 7 \text{ km [W]} \end{aligned}$$

change in position
↓

$$\begin{aligned} \text{(c)} \quad \text{DISTANCE} &= \text{TOTAL LENGTH OF PATH} \\ &= 13 \text{ km} + 20 \text{ km} \\ &= 23 \text{ km} \end{aligned}$$

Same result
as adding the displacements

- #2 $[N45^\circ E]$ LIES ALONG SAME LINE AS $[S45^\circ W] \Rightarrow$ COLINEAR VECTORS.

$$\begin{aligned} \Delta \vec{d}_R &= \Delta \vec{d}_1 + \Delta \vec{d}_2 \\ &= 4.0 \text{ km [N}45^\circ\text{E]} + 6 \text{ km [S}45^\circ\text{W]} \\ &= 4.0 \text{ km [N}45^\circ\text{E]} - 6 \text{ km [N}45^\circ\text{E]} \\ &= -2.0 \text{ km [N}45^\circ\text{E]} \\ &= +2.0 \text{ km [S}45^\circ\text{W]} \end{aligned}$$

- #3 This question provides you with changes in position

$$\therefore \Delta \vec{d}_R = \vec{d}_f - \vec{d}_i = 9.7 \text{ m [back]} - 2.1 \text{ m [back]} = 7.6 \text{ m [back]} \text{ or } 7.6 \text{ m [S]}$$

Adding Non-Colinear Vectors

#4 $\vec{d}_f = 4.0 \text{ km [E]} + 5.0 \text{ km [W]} + 7.0 \text{ km [W]} + 6.0 \text{ km [S]}$

COLINEAR

COLINEAR

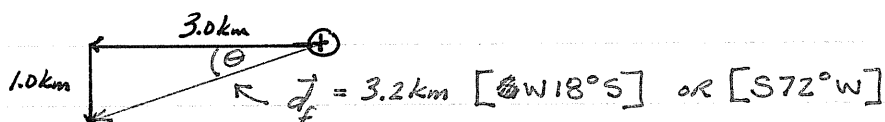
$$= 3.0 \text{ km [W]} + 1.0 \text{ km [S]}$$

VECTORIALLY

1 cm = 1 km



vectors are added
tip to tail

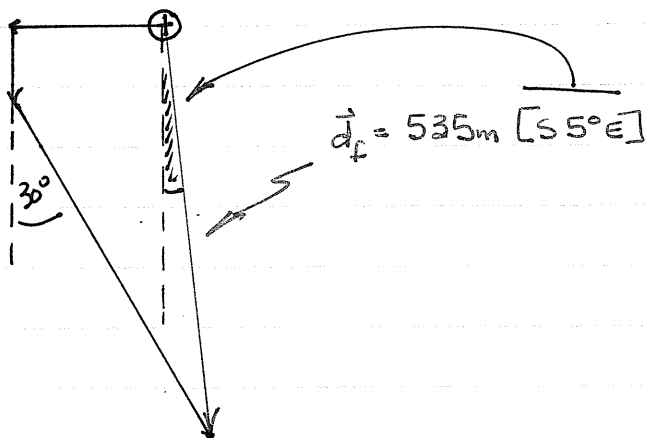


#5 $\vec{d}_f = 200 \text{ m [W]} + 100 \text{ m [S]} + 500 \text{ m [S}30^\circ\text{E]}$

none of these vectors are colinear \Rightarrow draw scale diagram
add vectors tip to tail

1 cm = 100 m

N
↑



#6

SEGMENT	TOTAL LENGTH OF PATH TRAVELLED	POSITION RELATIVE TO "A"	CHANGE IN POSITION
	DISTANCE TRAVELLED		DISPLACEMENT
AB	28m	15.2m [E]	15.2m [E]
BC	14m	17.6m [N61°E]	8.4m [N] ← change in position as object went from B to C.
CD	30m	27.6m [N48°E]	11.6m [N26°E]
AC	42m	17.6m [N61°E]	17.6m [N61°E]
AD	72m	27.6m [N48°E]	27.6m [N48°E] ↑ change in position from A to D.
BD	?	?	?
	44m	27.6m [N48°E]	19.2m [N15°E]

-if you were able to get the BD answers then you understand the concepts

For #9, 10 → FOLLOW THE CONCEPTS PUT FORTH IN QUESTIONS 1 + 5